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Mr. Eric P. Newman
6450 Cecil Avenue
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Dear Eric,

It is always a pleasure to get your telephone calls, and there is never a problem with Saturday morning, or any time for that matter. You caught me reading the paper this morning, right after shoveling the driveway. You said that it was cold in St. Louis; it has snowed all day here, and it looks as if we will have quite a bit by nightfall.

I did not send you an early draft of my article for the ANA anthology because you were out of the country, and I was pushing to get it finished before the deadline. Here is a copy now, and I would be very grateful if you could look it over and tell me if there are any glaring errors. I have cleaned it up a bit since this draft, but essentially it is like the finished copy.

Also enclosed is a glossy photo of the mystery hub. No need to return either the draft or the photo if you want to have them for your file. Perhaps you or some other reader will find this of some interest. I do not think that anything has ever been published on the subject, and have never heard of any mint using the transfer method in die preparation.

Your frank opinion on the article will be very much appreciated. Please do let me know what you think of it. I am sure that there is still time to make any corrections if there are some serious blunders in it.

Glad to have you back. Enjoy the holidays!

Sincerely,



Kenneth E. Bressett
ANA Centennial Anthology
November 1989

AN EXPERIMENTAL ROLLER HUB
OF THE SECOND U.S. MINT

Kenneth E. Bressett

*This will be read
many years later
and should be dated specifically
1991.*

A chance conversation with the Director of the U.S. Mint ~~some~~
~~20 years ago~~ when my interest and curiosity about what I was
told was an early experiment with roller presses ^{used in the production of} for ~~making~~
U.S. coins. The use of such equipment had never been recorded
by the U.S. Mint, or in fact by any major mint ^{after} since the in-
troduction of the improved coinage press by Boulton and Watt.
There was, however, a belief within the Mint that the 1965
General Motors experiment with a roller ^{coining (or coinage)} press was not the
first attempt to use that method of coinage in the production
of U.S. coins.

*1971?
about 1969?*

*this avoids
the
Director
being
accused
of making
a
mistake*

The General Motors press that kept creeping into our conver-
sation was a private-industry experiment to produce a coinage
press capable of much faster production than ever before. In
an effort to manufacture sufficient coinage to overcome the
1964 coin shortage, General Motors was commissioned to create
a new type of coining press, called a roller press, whereby
dies would be situated ^{on} around the periphery of ^{two rotating wheels} a wheel. A
strip of metal would be fed into one side, and coins would
fall out the other side into compartments. After lengthy trials
throughout 1965, the project was abandoned as unworkable.

Coordinated

Exactly why Mint officials were convinced that a similar type
of press had been tried at a much earlier time remained a
mystery until I was told that some of the 1835 dies or equip-
ment were still in existence at the Mint in Philadelphia. I was
invited to examine them on my next visit if it would help to
explain the process that Mint officials associated with the
beginning of the second U. S. Mint around 1834. The experi-
mentation with a roller press now seemed quite plausible in
light of the many improvements made in the Mint by Franklin

Peale around that time. I had to learn more. Fortunately, I was scheduled to go to Philadelphia the following month, so I set up an appointment to visit the Mint and see for myself whatever was still in existance^e of this early equipment.

What I was shown was ^{at first} slightly disappointing, but only because it was not a roller die. A ^{further} quick inspection showed that it was actually a hub. The Mint believed, however, that it could have been used to make a roller die. A more careful examinataton convinced me that it had to be some sort of roller transfer hub intended for use in making individual dies of the traditi-onal style and form. At that time I was only allowed to study and sketch the roller hub without benefit of impressions or photography. A thorough search for additional pieces of equip-ment, dies or records produced nothing to confirm or explain the mysterious hub which seemed to be intended for making dies of the large cent dated 1835.

As far as could be determined, the cylinder was used only on an experimental basis and no dies were successfully produced from it. The hub appeared to be made from hardened steel, and was not worn to any degree. It did ^{have} ~~suffer from~~ three large cracks. Overall length from end to end was approximately $6\frac{1}{4}$ "; the cylin-drical barrel, or image area, was $2\frac{1}{4}$ " wide and $1\frac{7}{8}$ " in diam-eter. Each end of the shank was machined to fit a square holder. It is presently in the custody of the Engraving Department at the Philadelphia Mint.

DEVELOPMENT OF THE ROLLING MILL

The concept of impressing coins or strips of metal by passing a ribbon through rollers was developed in Nürnberg between 1530 and 1540 and later spread through Germany and central Europe. It was soon determined that if designs were engraved on both the upper and lower rolls, and the rolls turned in unison, the strip could be ^{impressed} ~~embossed~~ on both sides and then cut to produce a coin. With this method only a small portion of the design was ^{impressed} ~~embossed~~ at any one instant. Thus, actual striking force was needed only

Embossment
can be
constructed
as the same
design on
both sides
I think

over the ^{small} area of the strip that was in contact with the ^{portion of the} image between the rolls. This method of coinage was successfully used by many mints for the next 200 years.

In principle, the advantage of strip rolling is that a much greater force can be applied to a small area and effectively produce far more pressure than could be exerted by a screw press. The ^{rotary} process can be used for both rolling strips of metal to a desired thickness for planchet cutting, or for striking coins in strips to be cut and trimmed later. The heavier striking power allowed for the manufacture of larger and thicker coins ^{than} ~~that~~ ever before and coincided with the introduction of thaler-size coins.

Application of the rolling mill for hubbing purposes apparently was not considered before the advent of steam power, probably because of the additional force needed to drive a ^{hardened} metal hub into even softened metal. The advantages of reproducing dies by some hubbing method had been known and used since ancient times, and the use of punches and compound hubs was well developed in this country both in Colonial times and certainly in the first U.S. Mint. The advance to using a fully developed hub that included all elements except the date and minor details had to wait for a source of power that could exert sufficient force to successfully transfer a large design from hardened to softened steel. The opportunity came with modernization of the ^{U.S.} Mint around 1833, but apparently was lost or blundered into ^{being} ~~and~~ rendered obsolete by development of the powerful steam coinage presses that were introduced ~~into this country~~ in 1836.

Frank H. Stewart, in his classic history of the U.S. Mint, states that technology was late in arriving at the Mint, and that some 50 years after Matthew Boulton and James Watt first used steam power for coinage at their Soho Mint near Birmingham, England, one could still walk past the U.S. Mint building in Philadelphia and see through its windows, "the bare-armed and vigorous men swinging the heavy and weighty balanced lever that drove ^{down} the screw with sufficient force so that by the momentum of the weighted ends

this quick threaded screw had the power to impress the blank and thus coin each piece". The inventions of Boulton and Watt, however, did not go unnoticed and by 1833 were being studied by Mint Director Samuel Moore who was concerned with supplying coins to a growing nation.

TRANSITION TO A NEW MINT

The second U.S. Mint was completed and occupied in January 1833. Machinery was moved from the original Seventh Street site and used until 1835 when most of the operations were replaced or improved by the use of steam power. During that time conversions were made for rolling, drawing and planchet cutting, but the coins continued to be struck by hand power. Although capacity for increased coinage production was growing with increased needs, it was evident that modern equipment should become a priority project for Director Moore.

The catalyst for change came early in 1833 when Franklin Peale was appointed Assistant Assayer at the Mint. Moore lost no time in directing Peale to use his mechanical talents and knowledge to seek out improvements by visiting the mints of Europe to examine their coinage methods. Peale's trip lasted for nearly two years and resulted in a number of valuable improvements in Mint technology. Director Moore, who for several years had contemplated the purchase of an entire system of machinery from Boulton, was well pleased by the recommendation of his brother-in-law, former Mint Director Robert Patterson, who had suggested Peale for the mission.

Dedrich Uhlhorn designed and patented the first successful modern coinage machine in 1817, but it was a Parisian engineer named Thonnelier who copied, modified and perfected the machine around 1833. Thonnelier had no factory and did not make the presses himself. He supplied designs to contractors who produced a diversity of models using his basic features. Franklin Peale was convinced of the superiority of the new equipment and upon his return from Europe he personally redesigned, rebuilt and supervised

the building of such a press by the Philadelphia foundry of Merrick, Agnew and Tayler.

? spelling

According to Mint Director Patterson's annual report of 1837, the first United States coins to be struck on the Peale press were the 1836 large cents which the Mint began making in March 1836. The first silver coins struck by steam power at the Mint were the reeded-edge half dollars made in November 1836. Other steam-powered presses were quickly built to enable full conversion of the coining operation. By 1837 Peale was sent to the newly established branch mints in Charlotte and New Orleans to supervise installation of presses there. With the completion of that work, he continued on to Dahlonga, where progress was slower and not properly finished until 1838.

Peale's success in modernizing the Mint and its equipment led to his appointment as Melter and Refiner in 1836 and Chief Coiner in 1839. In addition to replacing the old screw presses with his improved versions of the steam-powered Thonnelier press, he also introduced the milling machine and other improvements in the Mint's machinery, as well as the revolutionary reducing pantograph known as the French Portrait Lathe. With this device, the Mint engraver could sculpture a clay or wax model and transfer the design directly to a steel die blank instead of cutting the design by hand into punches and dies. The many changes put in place by Peale allowed the Mint time to consider new designs and faster production as well as expansion to the three newly established branch mints. It also allowed Peale time to experiment with other innovations and attend to his growing fondness for producing medals for his own pleasure and profit.

*or
Jannier
machine
?*

By 1835 Samuel Moore, the outgoing Director of the Mint, asked the Secretary of the Treasury for a second Engraver to maintain Mint capacity and keep up with demands from the branch mints. He hoped that his talented acquaintance, Christian Gobrecht, could be taken from his job as a bank note engraver and employed as an assistant to Mint Engraver William Kneass. The skills of Gobrecht, Moore reasoned, would provide fast and excellent new designs, and

the quickness of Kneass would multiply dies through the use of steam and powerful new presses. Gobrecht received his appointment in September, but only after Kneass had suffered a stroke that left him unable to perform all of his duties. Gobrecht began work on new coin designs immediately with skills honed from previous work on Peale's private medal projects.

As early as 1825, Gobrecht had worked on dies for medals struck at the U.S. Mint. In that year he created the Franklin Institute medal (Julian AM-17), and shortly thereafter the Charles Carroll medal (Julian PE-6) and a portrait piece of Charles Willson Peale (Julian UM-23) which had been commissioned by his son Franklin. The stage was now set, with players in place, to begin experimentation on the mass production of dies from innovative new methods.

There is little doubt that Christian Gobrecht and Franklin Peale were largely responsible for creating the mysterious roller hub dated 1835. They had the opportunity, talent and inclination to do so. The more troublesome questions are "When was the experiment carried out?" and "why was it abandoned, considering the mechanical advantages of roller transfer?" The principle has been used for a very long time to transfer images ^{from one ~~steel~~} to steel printing plates ^{to another} for bank notes and stamps, but nowhere to my knowledge has it been used for reproducing coinage dies.

THE DESIGN ELEMENTS

By 1978 I was able to get a better look at the roller hub, and to examine photographs and impressions of the design elements. The image area consists ~~of~~ of a series of four relief designs that are spaced evenly around the center of the cylindrical barrel. The coin design is that of a United States large cent dated 1835. The 5 in the date is much weaker than the other figures. There are two obverse and two reverse images. The hubs are orientated head-to-foot, as dies are in normal coin rotation. The diameter of the image is slightly larger than a struck coin because of the full width of the denticles around the border. A series of guide lines outside the image area correspond with the center of each

Were ~~the~~ ^{any} of these struck in a smooth collar or not by lost time? I presume so.

coin design. The relief of the design appears identical to all normal coins of the period.

The extraordinary feature of this hub is that the obverse design does not match any known die or style for 1835. The head punch is ~~that~~ first used in 1837 with beaded hair cords, ^{which were} ~~i.e., the style of 1837-39.~~ ^{and continued into 1839.} The stars, as well as the letters used on the reverse, are of the style used after 1836. There is a centering dot on the reverse and a line under the word CENT. ~~Unfortunately,~~ I cannot discern the existence of any centering mark on the obverse. The use of a depression rather than a raised dot might have been a key to linking this experiment to the unexplained 1839 Large Cent, Newcomb 9, and the 1837 Half Dollar, Reiver 12, which have such depressions in place of raised centering marks. The thought of such a connection is intriguing, as there seems to be no other reason for these lone exceptions to normal die production, and they could very well be part of this same experiment.

The most likely "window of opportunity" for making the roller hub would have been between January 1836, after Peale had returned from Europe and appointed Refiner and Melter with work well under-way on construction of the new steam-powered presses, and before he left Philadelphia in August 1837 to set up the new mint in Charlotte. It was also exactly during this period that Gobrecht was trying his hand at new and improved coin designs for various denominations, including the cent. Newly appointed Mint Director Robert Maskell Patterson was very much in favor of all such experiments, and entirely supportive of both men. Whatever the outcome of this venture, it seems sure that no dies or coins ever resulted from their efforts, and that the existing hub remains as the sole surviving piece of tangible evidence of the experiment. Peale's writings however, provide one additional glimpse at what he was trying to accomplish.

MASTER OR MIMIC?

Franklin Peale was the son of Charles Willson Peale, the eminent American artist and founder of Peale's Museum. He was born in the

Hall of the American Philosophical Society on October 15, 1795, and presented to the society by his father at age four months as "the first child born in the Philosophical Hall", and with a request that the society should name him. He was accordingly named after the chief founder and first President of the Society, Benjamin Franklin. Each of the other sons of C.W. Peale were named after painters — Raphael, Rembrandt, Vandyke, Titian and Rubens.

Young Franklin showed a taste for mechanics, and his father gave him every opportunity to improve himself with studies at the University of Pennsylvania and Germantown Academy. At the age of 17 he entered employment at the machine shop of Hodgson & Bro., Delaware. Later he became manager of his father's museum in Philadelphia. The museum attracted considerable attention because it contained many seldom-seen objets d'art, paintings by members of the Peale family, and unique natural history displays of birds and animals. After the incorporation of the museum in 1821, metal admission tokens or passes were issued bearing the portrait of Charles Willson Peale, engraved by Christian Gobrecht.

Sometime around 1831 or 1832, Peale assisted Matthias W. Baldwin in the construction of the first locomotive built in this country. The machine, known as "Old Ironsides," was in service for 10 years and launched the famous Baldwin Locomotive Works. Peale seems to have gathered much from his association with Baldwin, for he mentions him often. Writing in the Journal of the Franklin Institute (Vol. 22, Philadelphia 1836), Peale describes at great length his newly adapted Thonnelier coinage press, and there admits: "Our esteemed friend and fellow-citizen, Mr. M.W. Baldwin, several years since, commenced the construction of a press on similar principles. His talents and mechanical skill are amply sufficient for its completion; and it is to be regretted, therefore, that his numerous occupations have prevented his prosecution of the subject." We shall later see that the use of steam power and the coinage press were not the only things of importance to the Mint that Franklin Peale learned from Mr. Baldwin.

Peale's writings in the Journal of the Franklin Institute are extensive because he was Lecturer on Machines for the Institute. His report in the 1833 Journal (Vol. 11) is, however, the most significant in relation to this investigation. It is repeated here in its entirety as submitted by Peale.

Notice of the application of the process of transferring to the art of Die Sinking.

By FRANKLIN PEALE, Lecturer on Machines in the Franklin Institute.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—Several years since it was desirable in the management of the Philadelphia Museum, to be possessed of appropriate medals; for the accomplishment of this object, dies, the device of which was a portrait of Charles W. Peale, were executed in a most satisfactory manner by Mr. C. Gobrecht. One of these dies was unfortunately cracked in the hardening, and thus rendered useless.

It subsequently became still more desirable that this object should be carried into execution, and that the likeness of the founder of the museum should be preserved. A prosecution of the subject led to the results which I will now state.

In the spring of 1825, Mr. M. W. Baldwin, aware of the applicability of the process of transferring, to die sinking for coinage, made at that time a transfer press, with which Mr. Kneass, of the United States Mint, made a perfectly successful experiment in the workshop of the former.

The object above stated led to a revival of this process, and its prosecution to completion, and I have now the pleasure to present to the Institute one of those medals, struck in silver, from dies which were made in the fall of 1832 by *transfer*, from the originals engraved by Mr. Gobrecht. I do not offer this medal as a sample of workmanship in this department of the arts: the first specimen in any art is generally, from that circumstance alone, inferior; but it is offered as a creditable specimen, and at the same time a satisfactory demonstration that the process of transferring is applicable to die sinking, with advantages that may be stated in a few words. The first of these advantages is great economy of labour. Any required number of dies may be taken from the original roller, all of them being *fac similes* of the original die. The process exercises, also, an advantageous effect on the metal, in raising it gently, and by successive efforts, with an equal condensation of the particles throughout all the portions of its surface, admitting at the same time of as many annealings as the *relief* of the device may require; of which the limits, as far as I can judge from my experience, are beyond the requisite elevation. From these facts I am fully authorized in believing that the risk of loss of the nearly finished work by cracking, in hardening, is much reduced.

A brief notice of the process, (which is applicable to all kinds of dies,) for general information, is all that I need offer, as an intimate knowledge could only be acquired by conducting it.

The die is engraved in the usual manner, except that it has a greater width of margin. It is then hardened and placed in the press, in contact with a soft roll, and subjected to the necessary pressure and roller, with occasional annealings, as may be found necessary, the frequency of which will depend on the depth of the device. The roll is then hardened, and the operation repeated with the substitution of a soft die, to receive the impression from the hardened roll; the die is then prepared and hardened in the usual manner; the roll being preserved to repeat the transfers, as often as may be desired.

The process of transfer is now used in the engraving department of the U. S. Mint, under the direction of Mr. Wm. Kneass, to whose liberal aid I am much indebted in the prosecution of this process to its successful completion.

I have the honour to be,

Very respectfully, yours,

FRANKLIN PEALE.

Philadelphia, April 24, 1832.

*engravings were
long before*

In this message, Peale's revelations fairly strain the imagination. Here, for the first time, he ^{admits} ~~tells~~ that it was actually M. W. Baldwin who developed the roller transfer process, ^{for dies} ~~and~~ ~~that he~~ used it as early as Spring 1825. Even more significant is the fact that the experiment was carried out with the help of Mint Engraver William Kneass. Exactly what that test used as a transfer die or hub is not evident, but it may very well have been the single engraving attributed to Kneass and produced at that time — the George Washington bust (Julian PR-27). There is no known corresponding reverse die or contemporary striking of this piece. It is known only from an 1860s mule.

We further learn from this report that Peale used the transfer process in the Fall of 1832 to reproduce a die used to strike an additional quantity of his museum passes with the portrait of his father, undoubtedly the variety without the words ADMIT THE BEARER (Julian UN-22). The roller hub transfer process, he said, was successful in every way and well suited to use in the Mint. Careful scrutiny of both varieties of the Peale Museum pieces fails to show any evidence of abnormal die preparation or striking. The obverse die appears to be identical on both types of passes; the reverses are only slightly different, as might be expected in the modification of wording.

The greatest surprise in Peale's 1833 Journal entry is his comment that the roller transfer process was being used in the engraving department of the U.S. Mint, under the direction of Mr. Kneass. If the date on his report is correct (April 24, 1832), we must conclude that the process was being used in the old Mint, prior to steam-power and Peale's improvements in the second mint building. If there is any truth to the statement, it might be that dies for some of the Mint medals were made from roller hubs, though there is no evidence or reason for such a procedure. The exact dates meant in the document remain in doubt, for within the text Peale refers to Fall 1832 as the period when his medals were struck, while the report is dated April that year. We are left to wonder about the correct dates.

The thought of Peale using the wrong date in his report is hardly surprising, even though it may have been a clerical error. It may tend to highlight some of the other idiosyncrasies of the time, such as the existing roller hub that is dated 1835, when it clearly must have been made at a later time. During the same period at the Mint we also received the 1833, 1834 and 1835 proof half dollars that could not have been made until after 1836, when the closed-collar steam press was in operation, and the 1801, 1802, 1803 and 1804 proof silver dollars that were probably all made about the same time along with the 1804 proof gold eagle.

Strange things were happening in the Mint in late 1836 and early 1837, and Peale always seemed to be in the midst of the activity. His very secure position and the admiration that he received for his mechanical adaptations gave Peale the opportunity to turn his attention to more frivolous and profitable activities at the Mint. His growing medal business that was conducted ^{primarily} ~~mostly~~ for personal gain might have been overlooked were it not for the resentment of his Mint workers, who were called upon to perform many other tasks hardly within their normal duties, and always to Peale's benefit.

Among his more extravagant and unsuccessful ventures, Peale had built a drawbench which cost the Mint over \$1,500. More than a failure, the apparatus was considered life-threatening to Mint workers. To expedite melting and refining operations, Peale purchased from his relative George Sellers an expensive set of molds for casting large ingots. Unfortunately, the system could not be adapted to the rolling machinery and thus proved useless. When he spent nearly \$2,000 for construction of a scale, Peale blamed his workers for their extravagance, failing to say that it was he who tried to gild the beam and other parts with gold.

Peale also introduced a large lathe for turning rolls that cost the government at least \$2,000. Although he admitted that the lathe had never worked and probably never would, he blamed its failure on the Mint's adoption of cast-iron rollers. Perhaps it was one of these blunders that eventually prevented Peale from using the

roller transfer method of hubbing at the new Mint. More likely it was the advent of steam power and the new, more powerful press that made the roller hub obsolete even before it became usable. Whatever the cause, there seems to be no evidence whatsoever to support a belief that dies were ever produced at the U.S. Mint from roller hubs.

Prior to his death in 1870, Peale wrote to John Jay Knox, Deputy Comptroller of the Mint, expressing his view on many of the Mint procedures, and calling to his attention the misuse of the term Engraver. He states: "the word (engrave) is not correct, and not applicable, because the dies for coinage are struck from a punch in relief, technically called a 'hub'. There is nothing for the die-sinker to do, further than to strike in the figures designating the year of coinage, all the processes being mechanical from the forging of the steel to the polishing of the tables of the die for use. I may be permitted to observe that a perfect knowledge of this process was acquired in the mint of Paris by myself, and introduced into the United States Mint, in place of the rude and laborious processes previously practiced."

About this same time, Charles E. Barber, Engraver of the Mint, also described the practice for die preparation in similar terms: "when all that can be accomplished to advantage in the die is completed, it is hardened, and a soft-steel impression is taken from it, and the unfinished parts completed. This steel relief is in turn hardened, and by means of a powerful press is driven into a soft piece of steel, thus making a die which, when hardened, is ready for use for making coins or medals." If another process had been used in earlier times, it was lost or forgotten by 1870, and nowhere recorded except in Peale's report dated 1832.

By 1854 the Mint had enough of Peale, who was by then even implicated with regard to medal dies that were missing from his charge, and in December he was fired by President Franklin Pierce. He was dismissed despite the support given to him by the newly appointed Mint Director George N. Eckert. In an astounding letter to the

Treasurer, Eckert wrote that he believed Peale to be nearly blameless of all charges, and that his mind had been influenced not by facts, but rather by general impressions!

CONCLUSIONS

The 1835 dated roller hub was most likely produced through the combined efforts of Franklin Peale and Christian Gobrecht. It must have been intended for use with new Mint equipment in the hope that it would speed up the production of dies through use of the mechanical principle successfully developed by M. W. Baldwin at least 10 years earlier in cooperation with Mint Engraver Kneass. The association of the roller hub with both Peale and Gobrecht, and the use of Gobrecht's 1837 Large Cent design, dates the experiment to a period late in 1836 or early in 1837.

on hardening
~~hardening~~
It seems likely that the cracks in the hub were a major reason for abandoning the roller transfer project. These may have been caused by an inability of Peale's other equipment to properly handle the turning or rolling of such hubs. Another equally valid reason for never using the roller hub could have been the introduction of steam power presses which could impress dies with equal ease, and at less expense than making a roller hub.

No records or numismatic evidence exist to establish that any coins were ever produced from dies made from roller transfer hubs. Certainly no coins were ever ~~produced~~ *struck* in the U.S. Mint by means of roller dies.

Whatever Peale's good qualities and contributions were for the Mint, he can also be long remembered as one who left a legacy of questions and confusion.

CAPTIONS

Peale Museum Medal struck c. 1825 (Julian UN-23)

Photograph courtesy American Numismatic Society

Peale Museum Medal struck c. 1832 (Julian UN-22)

Photograph courtesy Auctions by Bowers and Merena, Inc.

Mint essay struck on the occasion of trials of the
Thonnelier press in 1833 when Franklin Peale visited
Paris to examine their modern equipment.

The steel roller transfer hub dated 1835 now preserved
in the Philadelphia Mint.

An Experimental Roller Hub
of the Second U. S. Mint

Bressett—ANA Anthology



